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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample and a personnel evaluation form are also included. (AG)

July 1967 United States Employment Service Test Research Report S-252R

S-252R

ED 065576

Development of USES Aptitude Test Battery

for

Barber

(per. ser.) 330.371

TM 001 263

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ED 065576

Technical Report on Development of USES Test Battery

For . . . . . .

Barber (per. ser.) 330.371

S-252R

U. S. Employment Service
in Cooperation with
California, Florida and North Dakota
State Employment Services

July 1967

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FOREWORD

The United States Employment Service General Aptitude Test Battery (GATB) was first published in 1947. Since that time the GATB has been included in a continuing program of research to validate the tests against success in many different occupations. Because of its extensive research base the GATB has come to be recognized as the best validated multiple aptitude test battery in existence for use in vocational guidance.

The GATB consists of 12 tests which measure 9 aptitudes: General Learning Ability, Verbal Aptitude, Numerical Aptitude, Spatial Aptitude, Form Perception, Clerical Perception, Motor Coordination, Finger Dexterity, and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, with a standard deviation of 20.

Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, in combination, predict job performance. For any given occupation, cutting scores are set only for those aptitudes which contribute to the prediction of performance of the job duties of the experimental sample. It is important to recognize that another job might have the same job title but the job content might not be similar. The GATB norms described in this report are appropriate for use only for jobs with content similar to that shown in the job description included in this report.

Frank H. Cassell

Frank H. Cassell, Director
U. S. Employment Service

GATB Study #2424, #2641, #2648

Development of USES Aptitude Test Battery

For

Barber (per. ser.) 330.371-010
S-252R

This report describes research undertaken for the purpose of developing General Aptitude Test Battery (GATB) norms for the occupation of Barber (per. ser.) 330.371-010. The following norms were established:

GATB Aptitudes	Minimum Acceptable GATB, B-1002 Scores
P - Form Perception	80
K - Motor Coordination	85
F - Finger Dexterity	90

RESEARCH SUMMARY - VALIDATION SAMPLE

Sample:

95 male student barbers enrolled at Molar Barber College in Fargo, North Dakota.

Criterion:

Supervisory ratings

Design:

Longitudinal (tests were administered at the beginning of the course of study and the criterion data were collected at the completion of the course.)

Minimum aptitude requirements were determined on the basis of job analysis and statistical analyses of aptitude mean scores, standard deviations and selective efficiencies.

Predictive Validity:

Phi Coefficient (ϕ) = .31 ($P/2 < .005$)

Effectiveness of Norms:

Only 65% of the non-test-selected students used for this study were good students; if the students had been test-selected with the S-252R norms, 76% would have been good students. 35% of the non-test-selected students used for this study were poor students; if these students had been test-selected with the S-252R norms, only 24% would have been poor students. The effectiveness of the norms is shown graphically in Table 1:

TABLE 1

Effectiveness of Norms

	Without Tests	With Tests
Good Students	65%	76%
Poor Students	35%	24%

VALIDATION SAMPLE DESCRIPTION

Size:
N = 95

Occupational Status:
Students

Training Setting:
Students were enrolled in Molar Barber College, Fargo, North Dakota. (Training course length is 1200 hours of instruction and practice, the completion of which takes approximately six months.)

School Enrollment Requirements:
Age: Applicants must be at least 16 yrs. of age
Education: 8th grade or the equivalent
Previous Experience: None
Tests: No tests used

Principal Activities: The job duties of the occupation for which these students were preparing are similar to those shown on the Fact Sheet in the Appendix. (The job description shown was prepared for Check Study Sample #1.)

Minimum Experience: All students in the sample had completed a six month training course at the time the criterion data were obtained.

TABLE 2

Means, Standard Deviations (SD), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for Age and Education

	Mean	SD	Range	r
Age (years)	24.5	6.9	17-48	-.066
Education (years)	10.8	1.8	8-14	.008

EXPERIMENTAL TEST BATTERY

All 12 tests of the GATB, B-1002A were administered to the validation sample during the period 1960-1961.

CRITERION

The criterion data consisted of ratings of proficiency by the school administrator.

Rating Scale: The USES Descriptive Rating Scale, Form SP-21, was used. The scale (see Appendix) consists of nine items with five alternatives for each item. The alternatives indicate the different degrees of job proficiency.

Criterion Score Distribution:

Possible Range:	9-45
Actual Range:	18-44
Mean:	32.3
Standard Deviation:	4.9

Criterion Dichotomy: The criterion distribution was dichotomized into high and low groups by placing 35% of the sample into the low criterion group to correspond with the percentage of students considered unsatisfactory or marginal. Students in the high criterion group were designated as "good students" and those in the low group as "poor students." The criterion critical score is 32.

APTITUDES CONSIDERED FOR INCLUSION IN THE NORMS

Aptitudes were selected for try out in the norms on the basis of a qualitative analysis of test and criterion data. Aptitude P which does not have a significant correlation with the criterion was considered because job analysts rated this aptitude as being important for the job duties and the sample had a relatively high mean on this aptitude. Tables 3, 4 and 5 show the results of the qualitative and statistical analyses.

TABLE 3

Qualitative Analysis
(Based on the job analysis, the Aptitudes indicated appear to be important to the work performed)

Aptitude	Rationale
P-Form Perception	Required in selecting proper barber tools to cut, shape and style hair according to patrons instructions.
K-Motor Coordination F-Finger Dexterity	Required in using electric and handclipping scissors and other barber tools in cutting and shaping hair and neckline; in trimming superfluous hair from eyebrows, nostrils and ears; and in shampooing hair and giving scalp and facial massages.

TABLE 4

Means, Standard Deviations (SD), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB.

Aptitudes	Means	SD	Range	r
G-General Learning Ability	100.9	14.1	63-147	.276**
V-Verbal Aptitude	94.1	13.0	66-129	.217*
N-Numerical Aptitude	98.8	21.1	48-151	.493**
S-Spatial Aptitude	107.2	17.9	65-140	.305**
P-Form Perception	105.6	18.9	29-152	.141
Q-Clerical Perception	103.3	13.3	74-137	.142
K-Motor Coordination	105.7	17.6	45-155	.205*
F-Finger Dexterity	101.8	20.1	35-147	.322**
M-Manual Dexterity	120.0	20.2	68-185	.250*

** Significant at the .01 level
* Significant at the .05 level

TABLE 5

Summary of Qualitative and Quantitative Data

	Aptitudes								
	G	V	N	S	P	Q	K	F	M
Job Anaylsis Data Important					X		X	X	
Irrelevant									
Relatively High Mean				X	X		X		X
Relatively Low Standard Dev.	X	X				X			
Significant Correlation with Criterion	X	X	X	X			X	X	X
Aptitudes to be considered for Trial Norms	G	V	N	S	P		K	F	M

DERIVATION AND VALIDITY OF NORMS

Final norms were derived on the basis of a comparison of the degree to which trial norms consisting of various combinations of aptitudes G, V, N, S, P, K, F and M at trial cutting scores were able to differentiate between the 65% of the sample considered good students and the 35% of the sample considered poor students. Trial cutting scores at approximately one standard deviation below the mean are tried because this will eliminate 1/3 of the sample with three aptitude norms. For two-aptitude trial norms, minimum cutting scores slightly higher than one standard deviation below the mean will eliminate about 1/3 of the sample; for four aptitude trial norms cutting scores slightly lower than one standard deviation below the mean will eliminate about 1/3 of the sample. The Phi Coefficient was used as a basis for comparing the trial norms. Norms of P-80, K-85 and F-90 provided optimum differentiation for the occupation of Barber (per. ser.) 330.371. The validity of these norms is shown in Table 6 and is indicated by a Phi Coefficient of .31 ($P/2 < .005$).

TABLE 6

Predictive Validity of Test Norms
(P-80, K-85, F-90)

	Nonqualifying Test Scores	Qualifying Test Scores	Total
Good Students	16	46	62
Poor Students	19	14	33
Total	35	60	95

Phi Coefficient (ϕ) = .31 Chi Square (x^2) = 9.36
Significance Level = P/2 < .005

DETERMINATION OF OCCUPATIONAL APTITUDE PATTERN

The data for this study did not meet the requirements for incorporating the occupation studied into any of the 36 OAP's included in Section II of the Manual for the General Aptitude Test Battery. The data for this sample will be considered for future groupings of occupations in the development of new occupational aptitude patterns.

GATB Study #2641

S-252R
Barber (per. ser.) 330.371-010
Check Study #1 Research Summary

Sample:
51 experienced barbers (49 male and 2 female) enrolled in refresher courses at Bell High School, Bell, California, and Long Beach City College, Long Beach, California.

TABLE 7

Means, Standard Deviations (SD), Ranges and Pearson Product-Moment Correlations with the Criterion (r) for Age, Education, Experience and the Aptitudes of the GATB.

	Mean	SD	Range	r
Age (years)	34.8	10.0	19- 59	.302*
Education (years)	11.4	1.5	6- 14	.089
Experience (months)	42.7	46.2	6-240	-.072
G-General Learning Ability	94.6	15.2	59-125	.499**
V-Verbal Aptitude	92.9	13.0	70-127	.457**
N-Numerical Aptitude	90.5	16.7	48-121	.412**
S-Spatial Aptitude	103.6	17.9	71-153	.519**
P-Form Perception	96.7	19.7	62-159	.276*
Q-Clerical Perception	99.1	15.2	80-139	.503**
K-Motor Coordination	97.4	18.4	29-130	.162
F-Finger Dexterity	89.6	21.1	37-129	.450**
M-Manual Dexterity	102.4	24.2	43-161	.277*

** Significant at the .01 level
* Significant at the .05 level

Criterion: Instructor's ratings obtained in 1965

Design: Longitudinal (tests were administered at the beginning of the course of study and criterion data were collected at the completion of the course.)

Principle Activities: The job duties for the occupation and the subjects contained in the course of study are shown on the Fact Sheet in the Appendix.

Predictive Validity:
Phi Coefficient = .33 ($p/2 < .01$)

Effectiveness of Norms:

Only 67% of the non-test-selected apprentices in this sample were good apprentices; if the apprentices had been test-selected with S-252R norms, 81% would have been good apprentices. 33% of the non-test-selected apprentices in this sample were poor apprentices; if the apprentices had been test-selected with S-252R norms, only 19% would have been poor apprentices. The effectiveness of the norms is shown graphically in Table 8.

TABLE 8

Effectiveness of S-252R Norms on Check Study Sample #1

	Without tests	With tests
Good Apprentices	67%	81%
Poor Apprentices	33%	19%

TABLE 9

Predictive Validity of Test Norms
(P-80, K-85, F-90)
Check Study Sample #1 (California)

	Nonqualifying Test Scores	Qualifying Test Scores	Total
Good Apprentices	12	22	34
Poor Apprentices	12	5	17
Total	24	27	51

Phi Coefficient (ϕ) = .33 Chi Square (x^2) = 5.66
Significance Level = $P/2 < .01$

S-252R GATB Study #2648

Barber (per. ser.) 330.371- 010

Check Study #2 Research Summary

Sample:
61 (3 female and 58 male) student barbers enrolled in Florida Barber College, Jacksonville, Florida.

TABLE 10

Means, Standard Deviations (SD), Ranges and Pearson-Product Moment Correlations with the Criteria (r_R and r_b) for Age, Education, Experience, and Aptitudes of the GATB.

	Mean	SD	Range	r_R	r_b
Age (years)	27.4	9.9	16- 58	-.214	-.257
Education (years)	10.8	1.6	8- 14	.217	.230
Experience (months)	3.8	2.1	1- 10	.047	-.027
G-General Learning Ability	90.2	16.4	55-125	.432**	.284*
V-Verbal Aptitude	88.6	13.9	63-117	.388**	.226
N-Numerical Aptitude	87.8	16.1	54-125	.362**	.172
S-Spatial Aptitude	93.3	19.4	55-137	.454**	.403**
P-Form Perception	92.9	20.5	37-135	.545**	.459**
Q-Clerical Perception	90.0	15.0	52-146	.536**	.410**
K-Motor Coordination	91.7	19.4	29-132	.333**	.216
F-Finger Dexterity	92.3	18.3	43-141	.416**	.311*
M-Manual Dexterity	97.6	22.5	28-150	.465**	.478**

Criterion: Rank comparison ratings (R) and final course grades (G) obtained in 1962.

Design: Longitudinal (tests were administered at the beginning of the course of study and the criterion data was collected at the completion of the course.)

Principle Activities: The job duties of the occupation are those shown in the Appendix for Check Study #1.

Predictive Validity:
Phi Coefficient = .43 ($P/2 < .0005$) with ratings
.36 ($P/2 < .005$) with grades

Effectiveness of Norms:
Based upon the rank comparison ratings, only 69% of the non-test-selected students in this sample were good students; if the students had been test-selected with S-252R norms, 95% would have been good students. 31% of the non-test-selected students in this sample were poor students; if the students had been test-selected with S-252R norms, only 5% would have been poor students. The effectiveness of the S-252R norms when applied to this sample is shown graphically in Table 11.

TABLE II

Effectiveness of S-252R Norms on Check Study #2

	Without Tests	With Tests
Good Students	69%	95%
Poor Students	31%	5%

TABLE 12a

Predictive Validity of Test Norms with #2 Rank Comparison Ratings Criterion
(P-80, K-85, F-90)
Check Study Sample #2 (Florida)

	Nonqualifying Test Scores	Qualifying Test Scores	Total
Good Students	21	21	42
Poor Students	18	1	19
Total	39	22	61

Phi Coefficient (ϕ) = .43 Chi Square (X^2) = 11.34
Significance Level = P/2 < .0005

TABLE 12b

Predictive Validity of Test Norms with Course Grades Criterion
(P-80, K-85, F-90)
Check Study Sample #2 (Florida)

	Nonqualifying Test Scores	Qualifying Test Scores	Total
Good Students	22	20	42
Poor Students	17	2	19
Total	39	22	61

Phi Coefficient (ϕ) = .36
Significance Level = P/2 < .005 Chi Square (X^2) = 7.82

A-P-P-E-N-D-I-X

Classroom Instruction (Provided to Sample in Check Study #1)

Thorough technical instruction to afford apprentices a knowledge of the craft which will develop the fundamental skills required to pass the California State Board exams. Below is an outline of the course content:

1. Care, Use, and Maintenance of Tools and Equipment.
2. California State Laws.
3. Maintenance of Shop, Sanitation, and Sterilization.
4. Barber Science (which includes related physiology).
5. Ethics of Barbering.
6. Salesmanship
7. Shop Management and Economics
8. Industry Organizations (state agencies and labor-management organizations.)
9. Public Relations
10. Improvement and Expansion of Skills and Services.

SP-21
Rev. 2/61

DESCRIPTIVE RATING SCALE
(For Aptitude Test Development Studies)

Score____

RATING SCALE FOR _____
D. O. T. Title and Code

Directions: Please read Form SP-20, "Suggestions to Raters", and then fill in the items listed below. In making your ratings only one box should be checked for each question.

Name of Worker (print) _____
(Last) (First)

Sex: Male_____ Female_____

Company Job Title: _____

How often do you see this worker in a work situation?

☐ See him at work all the time.

☐ See him at work several times a day.

☐ See him at work several times a week.

☐ Seldom see him in work situation.

How long have you worked with him?

☐ Under one month.

☐ One to two months.

☐ Three to five months.

☐ Six months or more.

A. How much work can he get done? (Worker's <u>ability</u> to make efficient use of his time and to work at high speed.)

☐ 1. Capable of very low work output. Can perform only at an unsatisfactory pace.

☐ 2. Capable of low work output. Can perform at a slow pace.

☐ 3. Capable of fair work output. Can perform at an acceptable but not a fast pace.

☐ 4. Capable of high work output. Can perform at a fast pace.

☐ 5. Capable of very high work output. Can perform at an unusually fast pace.

B. How good is the quality of his work? (Worker's ability to do high-grade work which meets quality standards.)

☐ 1. Performance is inferior and almost never meets minimum quality standards.

☐ 2. The grade of his work could stand improvement. Performance is usually acceptable but somewhat inferior in quality.

☐ 3. Performance is acceptable but usually not superior in quality.

☐ 4. Performance is usually superior in quality.

☐ 5. Performance is almost always of the highest quality.

C. How accurate is he in his work? (Worker's ability to avoid making mistakes.)

☐ 1. Makes very many mistakes. Work needs constant checking.

☐ 2. Makes frequent mistakes. Work needs more checking than is desirable.

☐ 3. Makes mistakes occasionally. Work needs only normal checking.

☐ 4. Makes few mistakes. Work seldom needs checking.

☐ 5. Rarely makes a mistake. Work almost never needs checking.

D. How much does he know about his job? (Worker's understanding of the principles, equipment, materials and methods that have to do directly or indirectly with his work.)

☐ 1. Has very limited knowledge. Does not know enough to do his job adequately.

☐ 2. Has little knowledge. Knows enough to "get by."

☐ 3. Has moderate amount of knowledge. Knows enough to do fair work.

☐ 4. Has broad knowledge. Knows enough to do good work.

☐ 5. Has complete knowledge. Knows his job thoroughly.

E. How much aptitude or facility does he have for this kind of work? (Worker's adeptness or knack for performing his job easily and well.)

☐ 1. Has great difficulty doing his job. Not at all suited to this kind of work.

☐ 2. Usually has some difficulty doing his job. Not too well suited to this kind of work.

☐ 3. Does his job without too much difficulty. Fairly well suited to this kind of work.

☐ 4. Usually does his job without difficulty. Well suited to this kind of work.

☐ 5. Does his job with great ease. Exceptionally well suited for this kind of work.

F. How large a variety of job duties can he perform efficiently? (Worker's ability to handle several different operations in his work.)

☐ 1. Cannot perform different operations adequately.

☐ 2. Can perform a limited number of different operations efficiently.

☐ 3. Can perform several different operations with reasonable efficiency.

☐ 4. Can perform many different operations efficiently.

☐ 5. Can perform an unusually large variety of different operations efficiently.

G. How resourceful is he when something different comes up or something out of the ordinary occurs? (Worker's ability to apply what he already knows to a new situation.)

☐ 1. Almost never is able to figure out what to do. Needs help on even minor problems.

☐ 2. Often has difficulty handling new situations. Needs help on all but simple problems.

☐ 3. Sometimes knows what to do, sometimes doesn't. Can deal with problems that are not too complex.

☐ 4. Usually able to handle new situations. Needs help on only complex problems.

☐ 5. Practically always figures out what to do himself. Rarely needs help, even on complex problems.

H. How many practical suggestions does he make for doing things in better ways? (Worker's ability to improve work methods.)

☐ 1. Sticks strictly with the routine. Contributes nothing in the way of practical suggestions.

☐ 2. Slow to see new ways to improve methods. Contributes few practical suggestions.

☐ 3. Neither quick nor slow to see new ways to improve methods. Contributes some practical suggestions.

☐ 4. Quick to see new ways to improve methods. Contributes more than his share of practical suggestions.

☐ 5. Extremely alert to see new ways to improve methods. Contributes an unusually large number of practical suggestions.

I. Considering all the factors already rated, and <u>only</u> these factors, how acceptable is his work? (Worker's "all-around" ability to do his job.)

☐ 1. Would be better off without him. Performance usually not acceptable.

☐ 2. Of limited value to the organization. Performance somewhat inferior.

☐ 3. A fairly proficient worker. Performance generally acceptable.

☐ 4. A valuable worker. Performance usually superior.

☐ 5. An unusually competent worker. Performance almost always top notch.

July 1967 S 252R

FACT SHEET

(Job Description for Check Study #1)

Job Description

Job Title: BARBER (per. ser.) 330.371.010

Job Summary: Performs personal services for patrons of barber shop. Cuts and styles hair using electric clipper, scissors, comb, electric hand massager and other barber tools. Performs other personal services as required such as shampooing hair, giving scalp and facial massages, shaves, and trimming superfluous hair from eyebrows, nostrils, and ears.

Work Performed: Cuts and shaves hair: Directs customer to barber chair, pumps lever arm of chair to raise it to height which puts top of customer's head slightly below eye level. Asks customer how he would like his hair cut Snakes out chair cloth and drapes it about seated customer. Places paper neck strip around customer's neck. Tucks small towel in collar around back of neck. Wraps chair cloth over customer to catch falling hair and lather. Clips hair on neck and temples, using electric clippers. Tapers, trims, and thins hair, using scissors and comb to obtain well-groomed appearance. Tilts or positions customer's head to obtain correct cutting angle in order to shape haircut.

Finishes haircut by shaving: Depresses switch on latherizer to obtain shaving lather in hand. Applies lather to temples and to nape of customer's neck. Strops wedge type straight razor on razor strop as lather soaks and softens hair. Holds ears and stretches parts of face and neck with one hand while scraping off lather and hair with razor in other hand to shave and shape sideburns and around hairline, ears, temples, and nape of neck. Wipes off excess lather with damp towel. Applies aftershave lotion to condition skin and soothe razor burn. Combs and arranges customer's hair. Trims stray hair from face, head, and neck. Offers customer mirror to inspect results. Releases brake of chair to lower chair to former position and permit customer to alight safely. Brushes stray hair from customer's clothing.

Shaves beard: Inserts headrest and tilts barber chair backward so that seated customer is in semi-reclining position. Heats clean face towel under hot running tap water. Wrings out excess water and drapes it on customer's face. Strops razor as beard softens. Puts razor down. Obtains lather from latherizer, removes towel, and applies lather to beard. Draws skin taut with thumb and fingers of one hand and scrapes off whiskers with razor in other hand. Removes beard from jaw, cheek, under chin, and around neck. Wipes off excess soap with damp towel, applies aftershave lotion, and pushes chair to upright position. Removes chair cloth from customer.

Shampoos customer's hair: Seats customer at sink and drapes plastic material around neck and shoulders to protect customer's clothing. Tilts head over sink and wets hair with water from spray attachment. Lathers head with shampoo, working it into hair and scalp with fingers or massage

brush. Rinses hair and scalp with spray and repeats operation. Dries hair by rubbing vigorously with a turkish towel. Applies hair dressing if desired by customer and combs hair. Removes protective cloths.

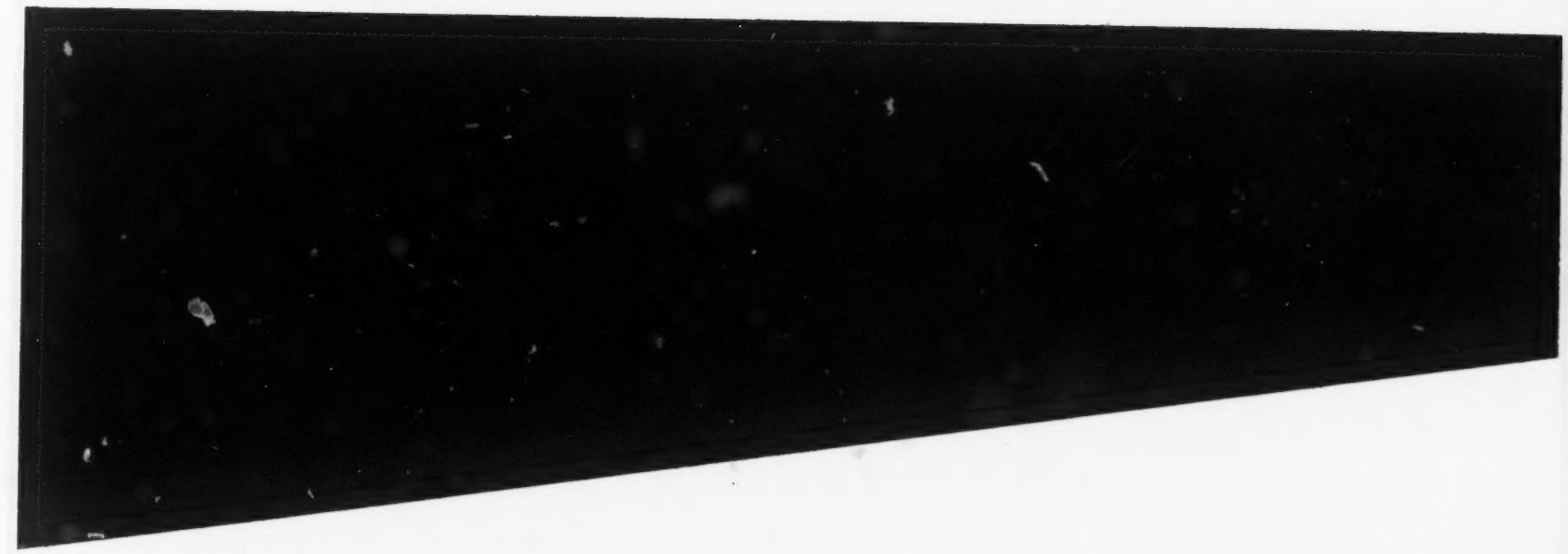
Massages: Massages scalp and neck, using a non-faradic hand vibrator, to stimulate circulation of blood in scalp and relax muscles of neck.

Performs other related duties: Opens store by unlocking front and back doors to permit adequate ventilation. Oils cutting blades of clippers and dusts shelves or sweeps cuttings from floor with broom and dust pan while waiting for customers. Accepts money and depresses keys on cash register to ring up sale. Gives change to customer.

Effectiveness of Norms: Only 65% of the non-test-selected students used for this study were good students; if the students had been test-selected with the S-252R norms, 76% would have been good students. 35% of the non-test-selected students used for this study were poor students; if these students had been test-selected with the S-252R norms, only 24% would have been poor students.

Applicability of S-252R Norms: The aptitude test battery is applicable to jobs which incluse a majority of duties described above.

GPO 930-005



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